

1. Consider a MUX which has a single control line (C) which selects between two inputs (A and B) to generate one output (M). Draw a truth-table for this device. Assume the input A is selected if C=0, otherwise the input B is selected. (5 points)

input A	input B	C	output M
T	T	0	T
T	F	0	T
F	T	0	F
F	F	0	F
T	T	1	T
T	F	1	F
F	T	1	T
F	F	1	F

2. If you were to construct a truth table for *Selector*, how many rows would it have? How many (input and output) columns? (5 points)

The number of rows
SW (10-6) SW (10-16) Sel (3)
 $2^7 \cdot 2^7 \cdot 2 = 2^{15}$
The number of input columns
 $7+7+1=15$
The number of output columns
 $7+7=14$

3. Assuming that SW[6:0] = 0b101 1110 and SW[16:10] = 0b001 0111, which red LEDs remain lit regardless of whether the KEY[3] is pushed or not? Note: The notation 0b1011110 represents a binary number. We will discuss this in more detail later. For now, you can assume SW[6] = logical 1 or switch on and SW[5]= logical 0 or switch off, etc. (4 points)

SW6	SW16	SW5	SW15	SW4	SW14
1	0	0	0	1	1
KEY[3] 1 : 0		0		1	
KEY[3] 0 : 1		0		1	

SW3	SW13	SW2	SW12	SW1	SW11
1	0	1	1	1	1
KEY[3] 1 : 0		1		1	
KEY[3] 0 : 1		1		1	

SW0	SW10
0	1
KEY[3] 1 : 1	
KEY[3] 0 : 0	

4. Assuming KEY[3] is 1, which switches must be set to what values if you want a "7" to be displayed on the seven-segment display? What if you wanted a "1" and KEY[3] was 0? If a given input doesn't matter, don't list it as part of your answer. (6 points)

"7"
turn on SW0, SW1, SW2, turn off the rest
"1"
turn on SW11, SW12, turn off the rest.